



**NNSA's Reliable Replacement Warhead Program  
Will Enable Transformation of the Nuclear Weapons Complex**

*"I am committed to achieving a credible deterrent with the lowest-possible number of nuclear weapons consistent with our national security needs, including our obligations to our allies." – President George W. Bush, May 2001.*

The Stockpile Stewardship Program (SSP) has successfully maintained the safety and reliability of the nuclear weapons stockpile for more than a decade, since the end of nuclear testing. Current plans foresee maintaining nuclear warheads produced in the 1980s for many decades in the future, far longer than originally planned. The approach to extend the service life of weapons is embodied in the warhead Life Extension Programs (LEP). Under LEPs, weapons are returned from the field and aging components are refurbished or remanufactured. To assure continued confidence, changes are minimized, so that refurbished designs are as close as possible to the nuclear-tested designs.

But concerns have been raised about this approach. Because our Cold War legacy warheads were designed to maximize explosive yield at minimum size and weight, they were designed relatively close to the "cliffs" of performance. We know from nuclear test experience that subtle changes in materials and processes inherent in remanufacture can affect performance. Indeed, the evolution away from tested designs, resulting from the inevitable accumulations of small changes over the extended lifetimes of the legacy warheads, means that we can count on increasing uncertainty in their long-term certification. Moreover, the current approach limits our ability to modernize the safety and security of US nuclear weapons. It forces the U.S. to retain a relatively large number of reserve weapons to ensure against contingencies and provide risk mitigation. Finally, this path neither preserves nor fully exercises the design expertise and manufacturing capabilities necessary to be able to respond to evolving or emerging threats. To address this, we are studying an evolution in our strategy from today's "certify what we build" to tomorrow's "build what we can certify." That is the basis for the Reliable Replacement Warhead (RRW) program—we believe it will enable further reductions in the number of stockpiled weapons.

This year's fiscal year 2006 appropriations bill includes a \$25 million study of the RRW. If we are successful fielding this warhead, it will help to create the nuclear weapons complex of the future -- a nuclear enterprise that is cost effective and sustainable for the long term. The RRW, which builds on the strengths of the existing SSP, starts with an improved vision of the future stockpile and nuclear enterprise.

In order to transform the enterprise in this way, the warhead designs that drive the enterprise must change. This will require a “design for manufacture” and “design for certification” philosophy with larger and more robust performance margins. These margins must be sufficient to accommodate known and quantified uncertainties. Designs that incorporate larger margins will likely be more tolerant of manufacturing variability, aging, and uncertainties in scientific modeling. With this approach, we believe that future warheads can be certified and sustained for the long term with high confidence without nuclear testing.

Future designs must also address more than just design margins and manufacturability. In the post-9/11 security environment, the nuclear weapon security posture requires improvement. Early integration of use control and security systems within the weapon design could reduce operational security risks and associated costs.

An important consideration for planning the future stockpile must be affordability over the lifetime of the warheads. The warheads in the future stockpile should incorporate designs that minimize life-cycle costs and use cost as a factor in determining the appropriate mix of warheads needed to maintain our deterrent and assure that the future stockpile can meet DoD needs.

The stockpile should be able to meet U.S. defense strategy goals and be able to address an uncertain future with uncertain adversaries. The U.S. nuclear stockpile of the future likely will have fewer weapons, both in the deployed and non-deployed forces. These weapons should have improved safety, security, reliability and sustainability.

In summary, RRW offers promise for a more cost-effective approach to maintain nuclear weapons in the U. S. stockpile. An RRW provides options to reduce the cost and risk of maintaining existing warheads by broadening performance margins, enhancing surety, and utilizing modern production techniques in replacement designs.

If it succeeds, the United States, the NNSA and the DoD should have a sound basis for meeting today’s and tomorrow’s nuclear weapons requirements.